

2050's

OPERATION AND MAINTENANCE PLAN
FOR POST-REMOVAL SITE CONTROL AT THE LEE'S LANE LANDFILL SITE
LOUISVILLE, KENTUCKY

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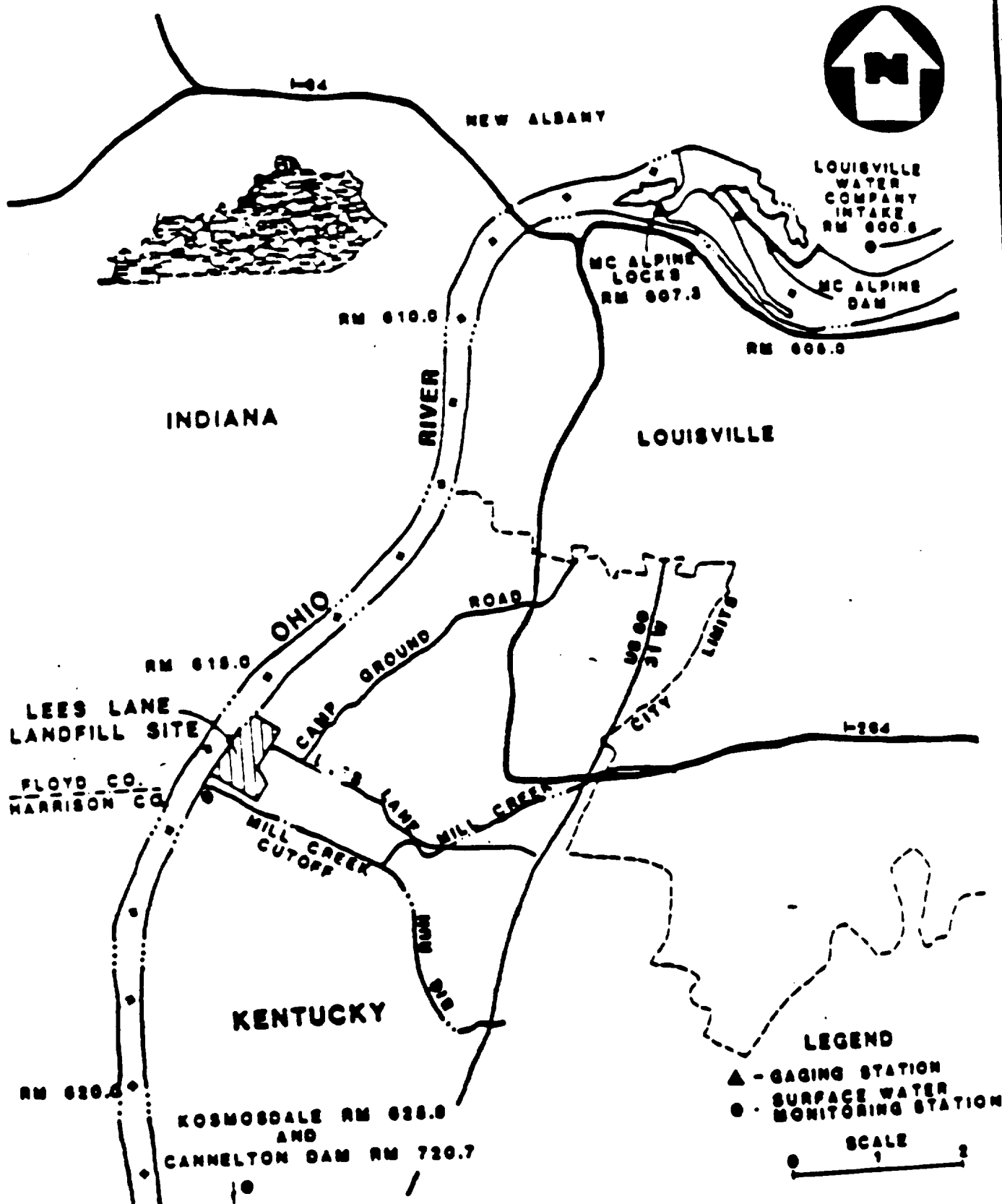
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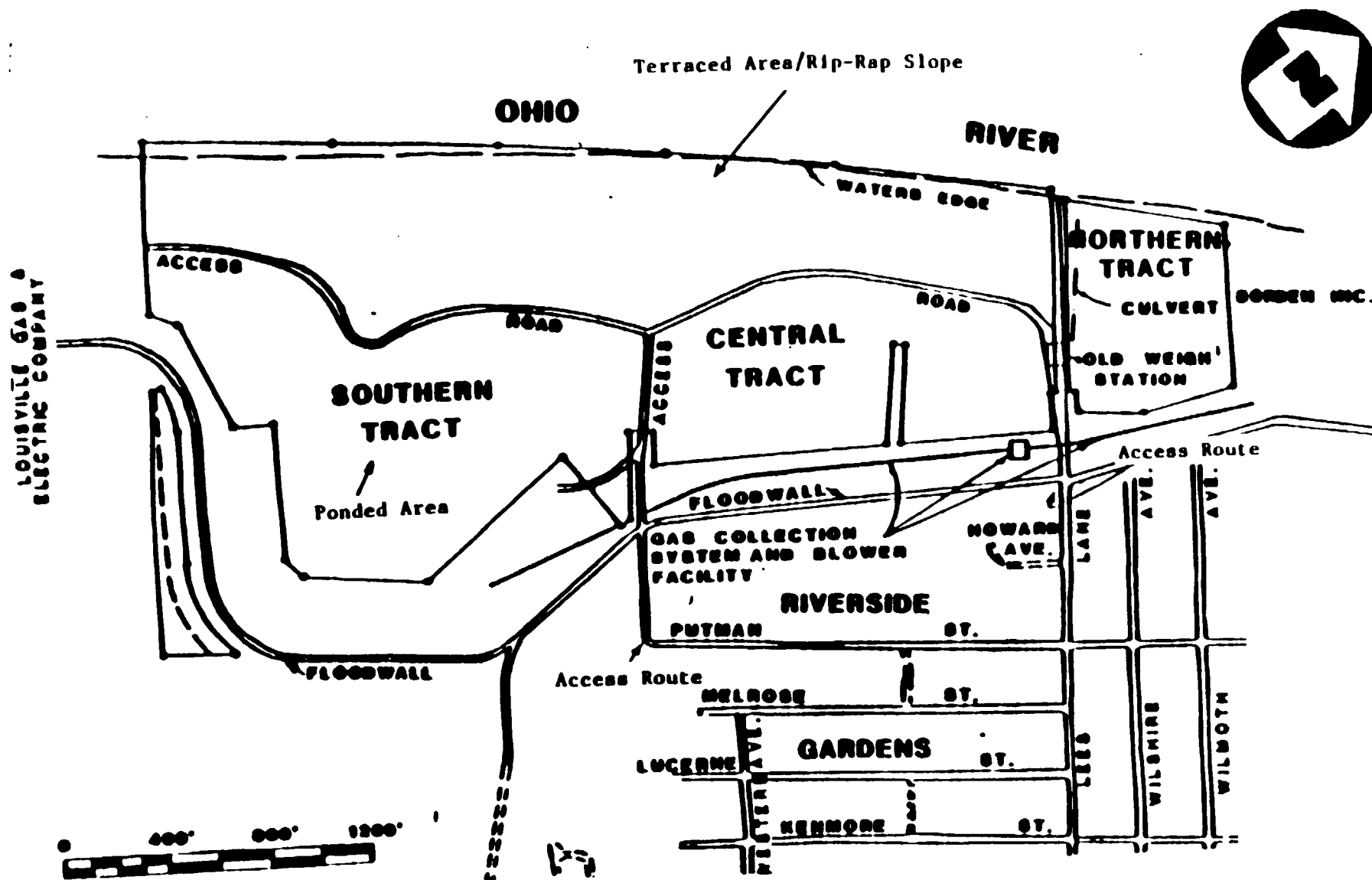
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1.0 INTRODUCTION

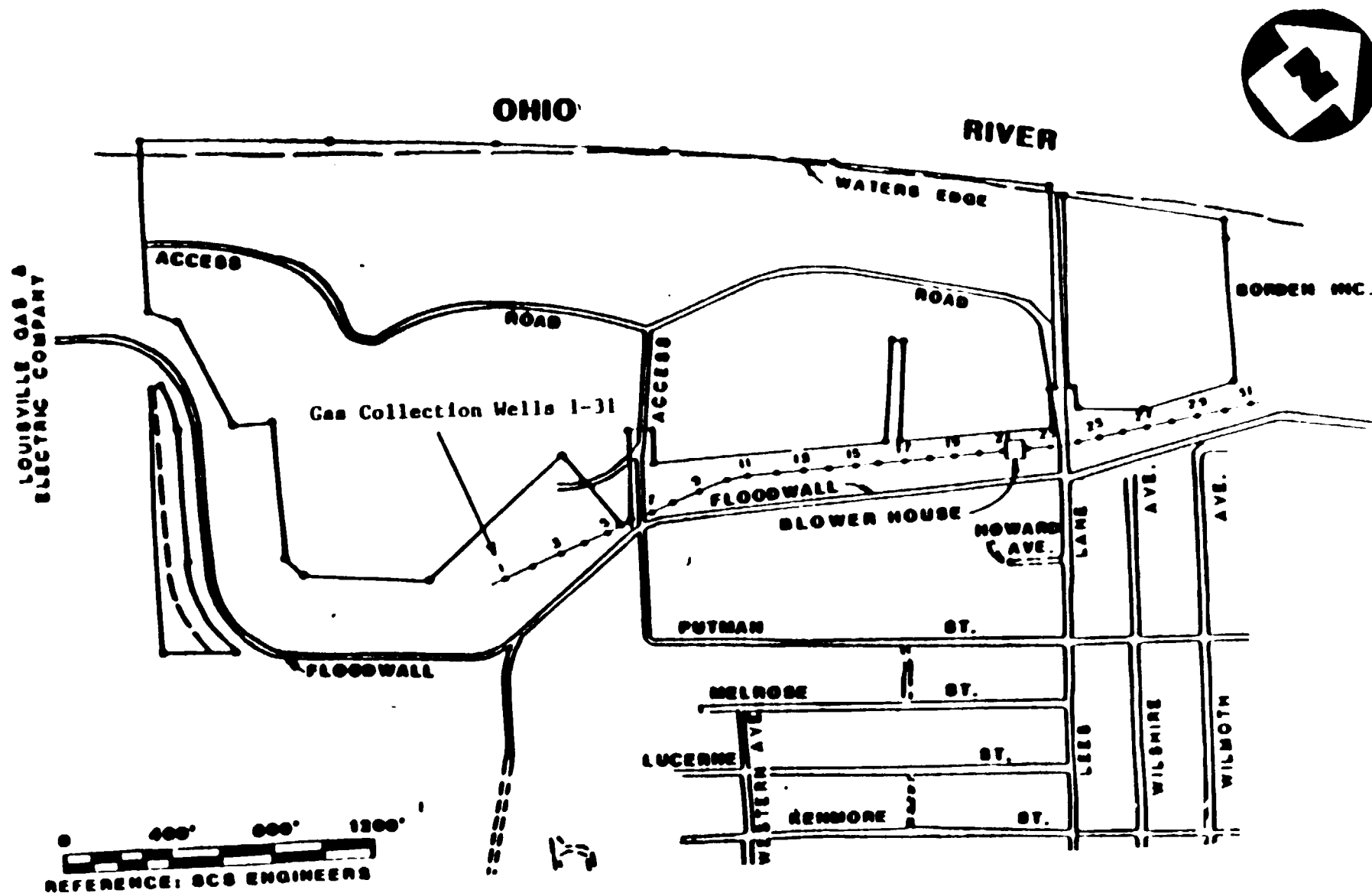
The 112 acre Lee's Lane Landfill site is located adjacent to the Ohio River in Jefferson County, approximately 4.5 miles southwest of Louisville, Kentucky (see Figures 1.0-1 and 1.0-2). The site consists of three tracts of land designated herein as the northern, central, and southern tracts (see Figure 1.0-2). The site is bordered on the east and south by a flood protection levee. To the northeast is Borden, Inc., a chemical manufacturer, and to the south is the Louisville Gas and Electric Cane Run Plant (a coal-burning electric generating station). Across the levee to the east of the site is Riverside Gardens, a residential development of about 330 homes and 1,100 people. The west side of the site has a terraced area, constructed as a part of the Response Action, which serves as a buffer zone between the landfill and the Ohio River. A gas collection system has been installed along the property boundary southeast of the site between the landfill and Riverside Gardens.

This Operations and Maintenance (O&M) Plan is an outline of the activities to be performed at the Lee's Lane Landfill Site to ensure the effectiveness of the Response Action. Also included in this Plan are descriptions of the technical procedures necessary to complete these tasks.





-4-



EBASCO

EBASCO SERVICES INCORPORATED

GAS COLLECTION SYSTEM
LEE'S LANE LANDFILL SITE
JEFFERSON COUNTY, KENTUCKY

FIGURE 4.1-1

2.0 LEES LANE LANDFILL SITE, KENTUCKY
OPERATIONS AND MAINTENANCE PLAN

Operations and Maintenance (O&M) activities include:

- Site Inspections
 - o Gas collection system
 - o Groundwater monitoring wells
 - o Gas monitoring wells
 - o Institutional controls
 - o Area wide site conditions (i.e., settlement, erosion, unauthorized dumping)
- Air Quality Monitoring
 - o Ambient air sampling
 - o Gas monitoring well sampling
- Gas Collection System Balancing and Maintenance
- Groundwater Quality Monitoring
 - o Groundwater monitoring well sampling
 - o Private well sampling
- River Bank Protection Controls
 - o Rip-rap slope and drainage swales
 - o Surveying
- Landfill Surface and Cap Monitoring and Maintenance
 - o Capped area adjacent to Ohio River and "hot spot" areas
 - o Mowing

These activities are to occur on a quarterly basis unless otherwise specified. A summary of activities and their frequency is given in the following sections. O&M activities shall be conducted for twenty-nine (29) years.

3.0 PERSONAL PROTECTION AND QUALITY ASSURANCE- QUALITY CONTROL PROCEDURES

This section covers general procedures to be followed during the performance of the various O&M activities and includes personal protection, technical references, quality control samples, data quality objectives, sample handling, field instrumentation, decontamination procedures and site waste management. Specific sampling procedures and observation requirements are covered in Section 4.

3.1 Personal Protection

Personal protection procedures substantially equivalent to those outlined in the Ebasco Health & Safety Plan (HASP) and in conformance with applicable regulations included in 29 C.F.R. 1910.120 shall be followed during all sampling operations (see Appendix A). All work shall be performed in personal protection Level D or greater described in Section 8.2 of the HASP. A Health and Safety Plan shall be developed hereto and followed during implementation of this O&M Plan.

3.2 Field Technical Guidance

The 1986 EPA Region IV Environmental Services Division (ESD) Standard Operating Procedures (SOP) and REM III Field Technical Guidelines (FTGs) shall be followed as provided herein. Applicable sections of these documents are included in Appendices B and C.

3.3 Quality Control Samples

Selected Quality Control (QC) samples shall be collected as described below as part of each sampling event.

QC samples shall include duplicate samples (including a duplicate for a matrix spike), trip blanks, preservative blanks, and field (or equipment) blanks. Table 3.1-1 summarizes the number of samples to be collected during each sampling event and the number of duplicates, trip blanks, preservative blanks, and field blanks. Also, shown on this Table are the types and methods of analyses to be performed, and the data quality objective (DQO) level required.

The collection and analyses of the QC samples shall be conducted in accordance with the SOP summarized as follows: One sample of each medium shall be duplicated for QC purposes. Duplicate samples collected shall be analyzed by a qualified laboratory following CLP protocol for all Target Compound List (TCL) parameters (see Appendix I). If field decontamination is conducted, field (or equipment) blanks shall be prepared during the sampling event from the final organics-free water rinse from a single piece of decontaminated equipment. The field blanks shall also be analyzed for TCL compounds. A trip blank for volatile organic analysis only shall be submitted with each shipment of samples. Preservative blanks shall be submitted for appropriate analysis (i.e., metals and cyanide) during each quarterly sampling event.

3.4 Data Quality Objective

Data Quality Objective (DQO) Level IV data are generated by laboratories using the CLP analytical protocol. DQO Level IV data shall be required for all sampling events.

TABLE 3.1-1

SUMMARY OF SAMPLING TASKS AND RELATED QC AND ANALYTICAL REQUIREMENTS •
LEE'S LANE LANDFILL SITE
JEFFERSON COUNTY, KENTUCKY

<u>Sampling Task</u>	<u>No. of Samples & Media</u>	<u>No. of Duplicate Samples</u>	<u>No. of Field Blanks</u>	<u>No. of Trip Blanks</u>	<u>No. of Preservative Blanks</u>	<u>Total No. of Samples</u>	<u>Analyses</u>
Existing Monitor Well and Private Well Ground- water Samples	6-water	2*	1	1	1	11*	ICL
Air Quality Monitoring	11-air	1	N/A	N/A	N/A	12	Selected Halogenated and Aromatic Hydrocarbons and Methane

*Includes duplicate for matrix spike provided to laboratory

*CLP protocol shall be followed for all analyses (DQO level IV)

3.5 Sample Identification and Chain of Custody

Each sample collected shall have its own number, which will apply during the entire project. The sample numbers to be used consist of a four-faceted alpha-numeric code, which identify the project, type of sample, the sample location, and the number of samples collected at each location.

The sample codes are:

- LL - Lee's Lane
- MW - Groundwater Monitoring Well
- PW - Private Well
- AS - Air/gas Sample
- TB - Trip Blank
- FB - Field Blank
- PB - Preservative Blank

Each location has a two-digit number (i.e., 01, 02, etc.) followed by a series number (the series number would identify the number of samples obtained from a particular location). For example, the first time monitor well MW-04 (Lee's Lane Landfill), is sampled, the number for the sample would be:

LL-MW-04-01.

The second time the well is sampled (i.e., second quarterly sampling), the sample number becomes:

LL-MW-04-02.

The private well sample follows a similar system with the replacement of "MW" with "PW".

The six ambient air sampling locations will follow a similar numbering system which began with air sampling station AS-01. The first time this station is sampled the sample number will be:

LL-AS-01-01

These sample designations correspond to the first sampling event. During future sampling events the last two numbers will change to correspond to the specific sampling event. An example would be, LL-AS-01-02, air sample collected northwest of the gas collection system during second quarter sampling event.

Similarly, the five air/gas samples collected from the gas monitor wells will be labeled "AS". However, this shall be followed by a "G" and the corresponding well number. For example, an air/gas sample from gas well no. 4 collected during the first quarter sampling event shall be LL-AS-G4-01.

For "blind" duplicates, a fictitious unique sample location shall be created. This sample location shall be designated a sample code similar to the other samples of the same medium and noted in the field logbook.

The chain of custody procedures set forth in the SOP (Appendix B) shall be followed.

TABLE 3.1-2

SAMPLE BOTTLE/CANISTER, PRESERVATION AND WASHING TIME REQUIREMENTS
 LEE'S LANE LANDFILL SITE
 JEFFERSON COUNTY, KENTUCKY

Total No. of Samples	Sampling Task	and Media	Analytes	Holding Time	Preservation Requirements	Bottle/Canister Requirements	Per Sample			
							1-gal. amber glass	2 40-ml vials	1-liter polyethylene	1-liter polyethylene
Groundwater	Samples (existing monitoring wells and private well)	11-water	fat org, pest, PCB, 7 days	cool 4 degrees celcius	1-gal. amber glass	9"				
			volatile organics	16 days	4 drops HCl	10'				
			metals	6 months	50% nitric acid, <2pt	9				
			cyanide	16 days	NAHM	9				
					>12 pH					
Air Samples	12-air	Selected	halogenated and aromatic hydrocarbons and methane	2 weeks	cap securely each in air tight containers	12"				

*Includes one bottle for matrix spike provided to laboratory

*Includes 2 vials for trip blank

**Includes one canister for QA/QC duplicate sample

3.6 Sample Container Requirements, Preservation, and Holding Times

Sample container, preservation, and holding time requirements specified in the SOP (Appendix B) shall be followed. Table 3.1-2 lists the total number of each type of sample collected during each sampling event as well as the associated container, preservation, and holding time requirements. All samples requiring preservation shall be preserved as soon as possible after collection. All sample containers shall be pre-cleaned according to SOP (Appendix B).

3.7 Sample Scheduling, Packaging and Shipping

Samples shall be packaged and shipped in accordance with the procedures set forth in the Quality Assurance Manual dated April 1, 1986, and the SOP (Appendix B). Sample shipments shall be coordinated to remain within specific holding times.

Prior to packaging any samples for shipment, the sample container will be checked for proper identification and compared to the site logbook for accuracy. The samples will then be wrapped with cushioning material and placed in a plastic cooler. A sufficient amount of bagged ice will be placed in the cooler to keep the samples at 4 degrees Celsius until arrival at the laboratory.

All necessary documentation required to accompany the samples during shipment will be placed in a sealed plastic bag and taped to the underside of the cooler lid. The cooler will then be sealed with fiber tape, and custody seals will be placed so any opening of the cooler prior to arrival at the laboratory can be detected.

3.8 Documentation

A bound, weather-proof site logbook shall be maintained which includes all information related to sampling time, weather conditions, unusual events (i.e., well tampering, etc.), field measurements, etc., as well as a summary of the day's activities.

Sample identification tags, chain of custody forms, chain of custody seals, and equipment calibration records shall also be maintained. Field Technical Guidelines FT-13.02 through FT-13.03 (Appendix C) shall be followed.

3.9 Field Instrumentation

Each of the following devices shall be calibrated according to the manufacturer's operating manual prior to each day's use:

- o Organic vapor analyzer
- o Temperature probe
- o Conductivity meter
- o pH meter
- o Photoionization detector
- o Electronic water level meter
- o Flame ionization detector

Calibration shall be documented in the field logbook. During calibration, an appropriate maintenance check shall be performed on each piece of equipment. If damaged or failed parts are identified during the daily maintenance check and it is determined that the damage could have an impact on the instrument's performance, the instrument shall be removed from service until the identified parts are repaired or replaced.

3.10 Decontamination Procedures

All sampling equipment is to be decontaminated using the procedures set forth in the SOP (Appendix B). If necessary, organic free water shall be taken to the site in glass containers for the decontamination process. The pesticide grade isopropanol will be applied directly from its original container.

All equipment shall be decontaminated on site. One decontamination (decon) station shall be set up within the study area. The station shall include a decon/drying surface covered with aluminum foil. The surface shall be constructed such that decon rinse solutions will remain on the surface thereby allowing for collection and evaporation.

The equipment shall first be scrubbed in a tub of non-phosphate laboratory detergent (such asalconox or liquinox)/tap water solution and rinsed with tap water in another tub. The piece of equipment shall then be placed on the decon surface and rinsed with deionized water and pesticide grade isopropanol as described in the SOP (Appendix B). Equipment shall be allowed to air dry and then wrapped in aluminum foil as described in the SOPs.

Waste isopropanol shall be captured separately in wash tubs and allowed to evaporate. Rinse water and detergent solution shall be discharged onsite onto the ground at designated locations.

3.11 Site Waste Management

All waste isopropanol used for decontamination shall be captured separately and allowed to evaporate, thus eliminating any potentially hazardous wastes. The Health and Safety Plan prepared pursuant to Section 3.1 shall address the handling and disposal of used protective clothing.

Noncontaminated protective clothing shall be gathered separately into plastic bags and disposed of as municipal solid waste. Contaminated clothing shall be containerized and properly disposed of in a permitted hazardous waste facility.

4.0 O&M FIELD OPERATIONS

4.1 Site Inspection

During each quarterly sampling event, the site shall be inspected including the following:

- o Gas collection system
- o Groundwater monitoring wells
- o Gas monitoring wells
- o Institutional controls
- o Area wide site conditions (i.e., settlement, erosion, unauthorized dumping)

The gas collection system, groundwater monitoring wells, and gas monitoring wells shall be carefully observed for any changes in their general condition. These observations shall be noted on the Report of Field Observations (Appendix J). More detailed criteria for these inspections are provided in Sections 4.3 thru 4.5.

Institutional controls (gate and barricade) have been placed at the site entrance at the end of Lee's Lane to limit vehicular access to the site. Their general condition shall be observed on each site visit to ensure their structural integrity. This includes a check for any damage caused by any vehicle, vandalism, and/or deterioration. Appropriate repairs shall be made as soon as any such damage is discovered.

Area wide site conditions shall be examined and any changes, such as settlement and erosion, noted. Additionally, any trespassing or dumping shall be noted and reported to EPA and the Kentucky Department of Natural Resources and Environmental Protection Cabinet (KDNREPC). Signs designating gas well locations shall be maintained and replaced as needed.

4.2 Air Quality Monitoring

Air quality monitoring shall be conducted to detect the presence of combustible gas during sampling of each of the gas and groundwater monitoring wells, ambient air sampling activities and during inspection of the gas collection system blower house. Specific monitoring procedures are described below.

Air quality shall be monitored with a Photoionization Detector (PID/HNU) and/or Flame Ionization Detector (FID) organic vapor analyzer (OVA) and a Combustible Gas Indicator (CGI). Monitoring shall be conducted continuously in the half breathing zone during all sampling activities and inspection of the blower house. The half breathing zone is defined as the zone of air located at the midway point of the vertical distance between the sampler's head and the top of the monitoring well or the floor of the blower house.

All instrument readings shall be noted in the field log books. Specific operating instructions for each of these instruments may be found in their respective operator's manual.

If any consistent half breathing zone measurement of organic vapors is greater than or equal to 0.5 ppm above background, modified level D personal protection equipment (PPE) (see Appendix A) shall be used. Measurements of 5 ppm above background or greater in an enclosed area of the site shall require evacuation of the area.

Monitoring with a combustible gas indicator (CGI) should be performed to determine the potential for build up of a combustible environment within the immediate area. Readings equal to or greater than 10% of the lower explosive limit (LEL) shall require continuous monitoring; readings greater than 25% of the LEL shall require that operations stop and evacuation procedures as set forth in the Health and Safety Plan be initiated. EPA and the KDNREPC shall determine when on-site activities can resume.

Prior to entering into the blower house, conditions inside the building shall be monitored with a FID and/or PID and CGI. If conditions are found to be below the established action limits, the blower house door shall be secured open and intermittent monitoring shall be conducted during blower system inspection procedures. If conditions are found to be greater than the established action limits, the blower house shall be allowed to ventilate and conditions shall be monitored until the concentrations drop below the action limits. Continuous monitoring shall then be conducted during blower system inspection procedures.

4.2.A Ambient Air Sampling

Ambient air samples shall be collected during each quarterly sampling event to monitor the ambient air onsite downwind from the gas collection system and in adjacent areas of Riverside Gardens. Meteorological monitoring shall also be performed in conjunction with this activity. Specific procedures and sample locations are described below.

4.2.A.1 Meteorological Monitoring

Data concerning wind speed and direction, temperature and barometric pressure shall be collected and recorded in the field log for:

- o verifying air sampling locations,
- o calibrating instruments, and
- o conducting analyses of ambient air samples.

Meteorological (MET) monitoring shall be conducted at Station 1 (Figure 4.2-1) and remain at that location throughout ambient air sampling. Placement of the meteorological system shall be in an open area, no less than 20 feet from any obstruction which could affect accurate meteorological data. The MET system shall be positioned with sensors approximately six to eight feet above ground.

4.2.A.2 Real Time Monitoring

A Combustible Gas Indicator (CGI) shall be used to monitor methane migration through the ground. The CGI shall be used at each sampling station. Readings shall be periodically recorded from the CGI prior to, during, and immediately following sample collection.

4.2.A.3 Number and Location of Ambient Air Samples

Ambient air/gas samples shall be collected from a total of six sampling locations. One sampling point shall be located upwind of

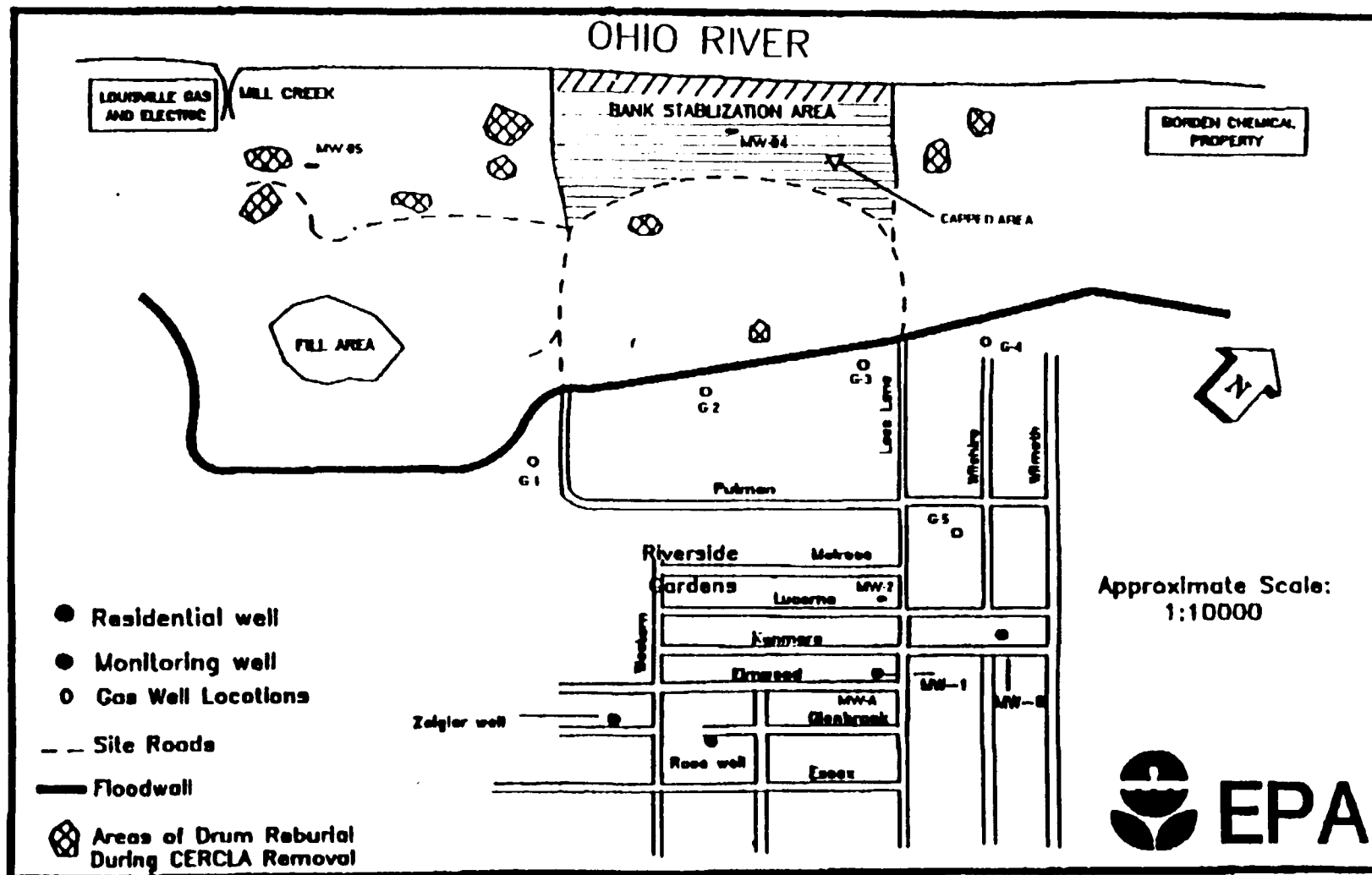
the existing gas collection system, two sampling points shall be located downwind of the gas collection system, and the remaining three sampling points shall be located adjacent to the site in the Riverside Garden residential area (see Figure 4.2-1). All canisters shall be accompanied by the air monitoring data form provided in Figure 4.2-2 or an equivalent form.

4.2.A.4 Ambient Air Sampling Procedures and Analysis

The samples shall be collected using the procedures described in EPA Method TO-14, from a height three to five feet above land surface using initially evacuated canisters and a pump-ventilated sample line. The sample shall be drawn through a sampling train comprised of components that regulate the rate and duration of sampling into a pre-evacuated passivated canister.

All ambient air samples shall be analyzed for benzene, toluene, methane, methylene chloride, xylene, and vinyl chloride.

The equipment required to collect ambient air samples is specified in Appendix D, Sections 7.1.1, 7.1.1.1-7.1.1.5, and 7.1.1.17. Time weighted average (TWA) samples shall be collected over a period of eight hours beginning at optimum times (daybreak) to allow for sample collection during adverse weather conditions. The samples shall be collected in accordance with Appendices D (Section 9.2 Sampling Procedure) and E.



WESTON SPER Region IV TAT

ACTIVITY DESCRIPTION: Map of site showing
well locations

SITE: Lees Lane Landfill Well Sampling

TUD NO.: 04-8808-26

DATE: 26 August 1988

Figure 4.2-1

4.2.B Gas Monitoring Well Sampling

Air/gas samples shall be collected from selected gas monitoring wells to monitor the effectiveness of the gas collection system in intercepting soil gases potentially migrating from the fill area in the central tract towards Riverside Gardens. Specific sample collection procedures and sample locations are described below. All gas samples shall be analyzed for benzene, toluene, methane, methylene chloride, xylene, and vinyl chloride.

4.2.B.1 Number and Location of Gas Well Samples

A total of five air/gas samples shall be collected from five gas monitoring well pairs located adjacent to the floodwall and at the corner of Wilshire Avenue and Kenmore Boulevard (see Figure 4.2-1). Installation records for these wells are included in Appendix H.

4.2.B.2 Gas Well Sampling Procedures and Analysis

Each of the five well pairs shall be monitored with a photoionization detector (PID), a flame ionization detector (FID), and combustible gas indicator (CGI). The well from each well pair which gives the highest readings on the screening instruments shall be sampled. If neither well from each well pair gives positive readings, the shallow well shall be sampled.

The samples shall be collected from dedicated teflon tubing installed in each well using the procedures described in EPA Method TO-14 and summarized below (Appendix D). Initially evacuated canisters and a pump-ventilated sample line shall be used to extract the sample. The sample shall be drawn through a sampling train comprised of components listed in Appendix D, Sections 7.1.1, 7.1.1.1-7.1.1.3, 7.1.1.5, and 7.1.1.17.

AIR MONITORING DATA SHEET

SECTION I : SAMPLE IDENTIFICATION

Sample Canister no. _____ Site Name/Project _____
Sample ID no. _____ Sample Technician _____
Type of Sample : Grab or Continuous Date _____
Sample Parameters: _____
Sample Location and Description: _____

SECTION II : CALIBRATION OF FLOW CONTROLLER (if applicable)

Pump ID no. : _____ Initial Flow Rate : _____ ml/min
Flowmeter Type : _____ Final Flow Rate : _____ ml/min
Time of Calibration : _____ Supplemental Flow Rate : _____ ml/min

SECTION III : WEATHER CONDITIONS

Temperature : _____ F/C Wind Direction (from hdg): _____ Wind Speed: _____
Meteorological Station Used : Yes/No MET Chart Reference No.: _____
Weather Narrative: _____

SECTION IV : SAMPLE CONDITIONS

Height of Sample Inlet: _____ ft Total Sample/Run Time: _____ min
Start Time: _____ Total Sample Volume: _____ L
Stop Time: _____
Remarks: _____



AIR MONITORING DATA SHEET
LEE'S LANE LANDFILL SITE
JEFFERSON COUNTY, KENTUCKY

FIGURE 4.2-2

The sampling canisters shall be received, evacuated, and sealed at subatmospheric pressure. One canister shall be positioned at each well to be sampled, attached to the dedicated teflon sampling tube, and opened at the appropriate time to allow the gas/air inside the well to be sampled.

Sampling procedures require the use of one 6-liter canister for each sample. The gas well vent line is to be left open while a low flow air sampling pump is attached to the sample line and the line purged for 30 seconds to clear any "dead" air. The pump is then to be removed and the canister is attached and opened. The canister is then allowed to pressurize for 45 seconds, thus collecting a sample. The canister is then to be closed, detached from the sampling line, labeled/tagged, and packaged for shipment. An air monitoring data sheet shall accompany each canister.

The samples shall be analyzed in accordance with EPA Method TO-14 (Appendix D).

4.3 GAS-COLLECTION SYSTEM

A gas collection system was installed on the site in October 1980 adjacent to the floodwall between the fill and Riverside Gardens (see Figure 4.3-1). Soil gases migrating towards Riverside Gardens are intercepted by the gas collection system and released into the atmosphere. The Design Report for the gas collection system is included in Appendix F.

4.3.A Gas Collection System Maintenance

The individual components of the gas collection system shall be observed quarterly to assess their condition. These observations shall be noted on the Report of Field Observation included in Appendix J.

The area around each component shall be checked for any settlement, erosion or vandalism which may have occurred. Each well shall be checked to ensure that the cover is in place and rests properly in the concrete collar. The vegetation around each well shall be trimmed to a nominal six inches height within a six foot radius of the well head. The service box lids shall be lifted from each well and moisture trap and the interior cleaned by removing visible debris, grass and leaf clippings, and dirt, so that there is no visible dirt or grease buildup. Missing and/or broken service box lids from any part of the well system shall be replaced. Damaged components including caps, plugs, stopcock valves and piping shall be repaired or replaced.

The ball valve service boxes shall be cleaned so that the valve access nut is visible from the ground surface. Additionally, the well system and moisture trap identification signs shall be checked and repaired and/or replaced as necessary.

The blower house shall be inspected and cleaned, and minor maintenance activities performed quarterly, as set forth below:

- o Upon inspecting the blower house, the blower system shall first be shut to "OFF". The blower should shut down. If the system does not shut down, this condition should be reported to the appropriate supervisory personnel for corrective action. The floor and other system components including valves and piping network shall then be thoroughly vacuumed and/or swept.

- o The blower motor, blower, and other equipment shall be oiled and greased as per the equipment manufacturer's suggested maintenance instructions.
- o The strainer in blower intake line shall be checked and cleaned as necessary.
- o The blower system shall then be turned to "ON". If the blower does not run, this condition shall be reported to the appropriate supervisory personnel for corrective action.
- o Once the blower is operating, the flange connections in the piping system shall be checked to determine if leaks are apparent. Flange bolts shall be tightened and/or gaskets replaced as necessary.
- o Suction and discharge pressures from the gauges located on the north and south headers and exhaust pipes shall be recorded.

4.3.B Gas Collection System Balancing

The gas collection system shall be balanced on a semi-annual basis in accordance with the procedures set forth in Appendix G.

Balancing shall include:

- o A check of the system to verify that it is operating according to established design criteria. The air velocity, pressure, and flow rate at each extraction well shall be checked using the velocity meter and manometer purchased by the EPA, presently in the possession of Jefferson County; and
- o Adjustments to the system.

A check of the system's ability to attract gas migrating from the site shall also be made prior to and following balancing operations by checking any overlap in each wells radius of influence. The basis of design for the gas collection system was predicated on each of the 31 wells pumping at a flow rate of 25 cfm and a pressure of -2.5 inches of water, thereby creating a negative pressure within a radius of 100 feet around each well (i.e., a radius of influence) (Appendix F). These radii or areas of negative pressure are designed to overlap to ensure that gas is drawn toward the various extraction wells. Based on the most current pressure and flow rate readings, the majority of the wells are pumping at or above the design criteria. This pumping rate should result in the desired overlap of each wells radius of influence.

The procedures to perform this check shall be conducted prior to balancing the system (to obtain "as is" information) and after balancing (to document the effectiveness of the balancing procedures) as follows:

- o Begin the inspection at well No. 21 located immediately south of the blower house.
- o Attach the stopcock valve, appropriate connectors, and manometer in order to read the individual pressures of the two adjacent wells (nos. 20 and 22). Instructions for use of the manometer are set forth in the October 7, 1987 IT letter included in Appendix G.
- o Attach the pressure reading assembly to well No. 21. Attempt to adjust pressure of well No. 21 to 0.0 inches of water or to the lowest pressure possible using the long handled valve wrench. A zero pressure indicates no

overlap in radii of influence. If a zero pressure can not be obtained then an overlap of radii of influence is to be assumed.

- o While maintaining the lowest pressure possible at well No. 21, read pressures of two adjacent wells (Nos. 20 and 22). A drop in pressure from the initial readings in these wells indicates an overlap in the radii of influence.
- o Re-adjust the pressure in well No. 21 as near as possible to design pressure (-2.5 inches of water)
- o Proceed to well No. 20 and check adjacent wells by following the steps listed above.
- o Continue the procedure through well No. 1.
- o Return to the blower house area and continue the procedure starting at well No. 22 (located immediately north of the blower house) and proceed to well No. 31.

In addition to these procedures, each well shall be checked for the presence of water and the total depth shall be measured to ensure that material (e.g. water, debris) has not entered the well. These observations shall be noted on the Report of Field Observation included in Appendix J.

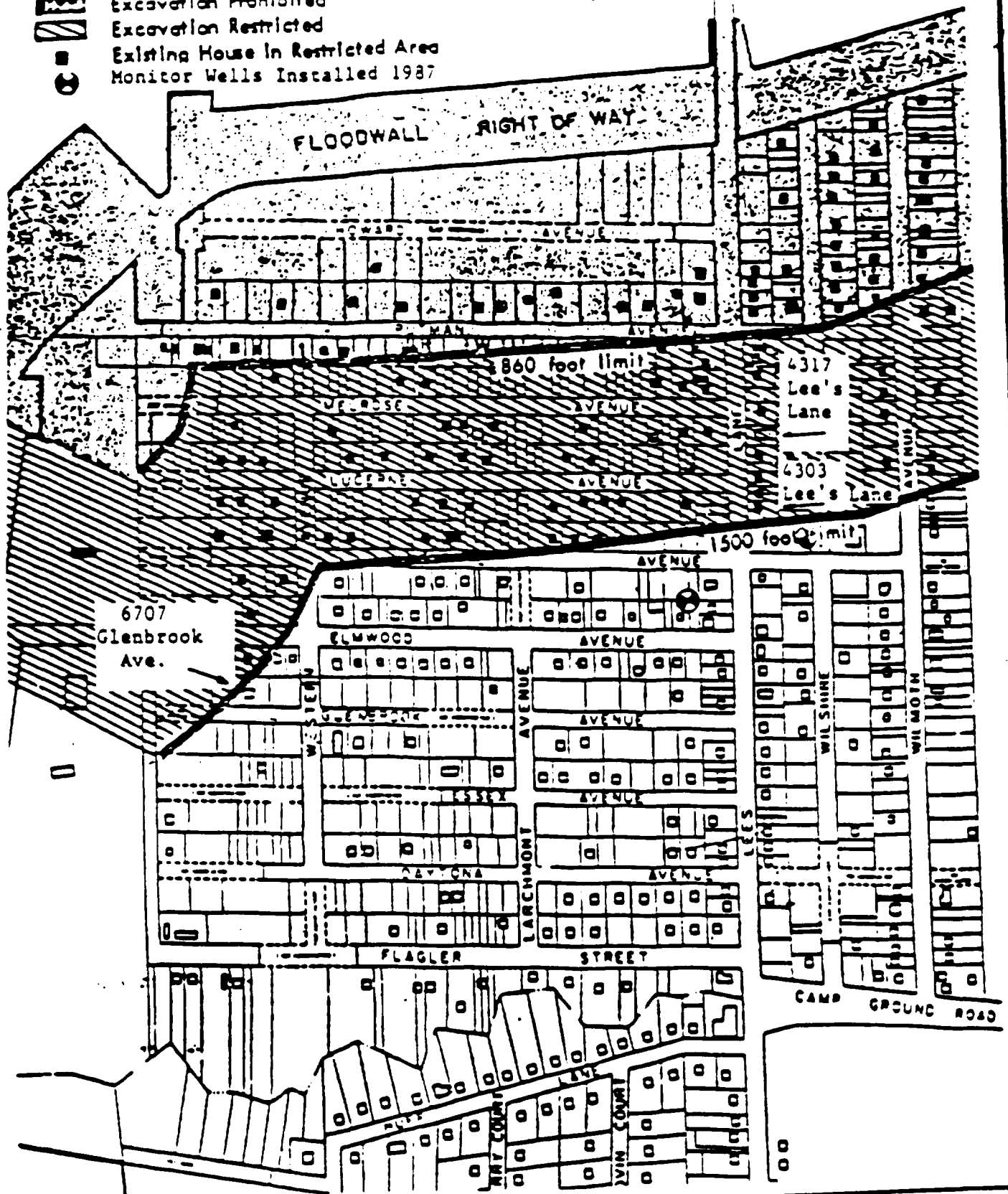
The individual wells not operating at design criteria shall be noted and reported to EPA and the Kentucky Department of Natural Resources and Environmental Protection Cabinet (KDNREPC). These wells shall be carefully inspected following the radius of influence check procedures listed above and the results noted. These wells shall be repaired so that they meet design criteria.

LEGEND



Excavation Prohibited
 Excavation Restricted
 Existing House In Restricted Area
 Monitor Wells Installed 1987

LEE'S LANE
 LANDFILL



1500 FOOT CHROMIUM CONTAMINATION ZONE
 LEE'S LANE LANDFILL SITE
 JEFFERSON COUNTY, KENTUCKY

FIGURE 4.4-1

An individual assessment of each of the wells operating below design standards shall be conducted prior to any repair. Well malfunctions may be caused by a rise of the water table which results in water entering the screened interval; cracked or broken pipes and seals from settlement or shifting of the surrounding earth; blockage of pipes and plumbing; or a reduced or inconsistent suction pressure and/or flow from the blower system. This assessment may include but is not limited to pressure tests isolating each well, removal of backfill material to visually inspect the pipes and plumbing, measurement of the water level (if any) and total depth, a caliper test for deep subsurface inspection, and an additional pressure check of the blower system.

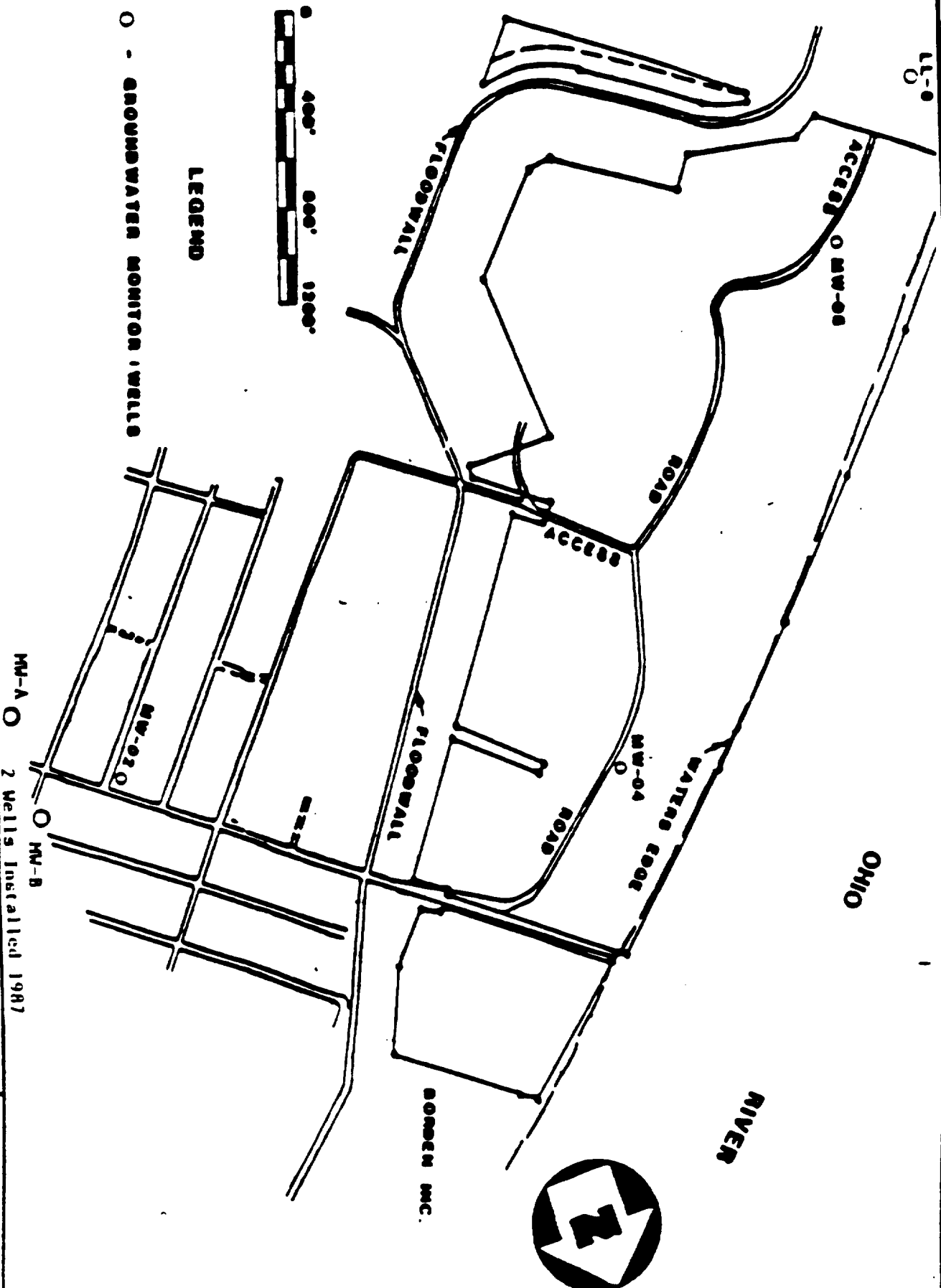
4.4 GROUNDWATER QUALITY MONITORING

4.4.A Number and Locations of Groundwater Samples

Groundwater samples shall be collected for chemical analysis from five existing monitoring wells (MW-A, MW-B, MW-02, MW-04, MW-05) and one private well (6707 Glenbrook Avenue) (Figures 4.4-1 and 4.4-2).

4.4.B Groundwater Sampling Frequency

The five monitoring wells and one private well indicated on Figures 4.4-1 and 4.4-2 are to be sampled on a quarterly basis for a period of three years. After the initial three year monitoring period, the monitoring program will be re-evaluated by EPA for the frequency of the sampling events. The frequency of groundwater sampling events for O&M purposes shall not exceed four events a year. However, additional sampling may be required to verify any unusual analytical results.



LEGEND

○ - GROUNDWATER MONITOR WELLS

MW-A ○ 2 Wells Installed 1987

GROUNDWATER SAMPLE LOCATIONS
LEE'S LANE LANDFILL SITE
JEFFERSON COUNTY, KENTUCKY

EPASCO
18000 SE WHEELS ROAD, PORTLAND, OR 97201

FIGURE 4.4.1

4.4.C Groundwater Sampling Procedures and Analysis

All groundwater samples associated with this plan shall be analyzed by a qualified laboratory following CLP protocol for Target Compound List (TCL) analysis. The results of the sample analysis shall be reviewed by EPA to identify the specific compounds to be analyzed during future sampling events.

4.4.C.1 Monitoring Well Purging and Sample Collection

Wells shall be purged and sampled in accordance with the procedures outlined in Section 4.7.5 of the SOP (Appendix B). Water level in each well shall first be measured with a decontaminated tape or water level indicator and the total volume of the water column calculated. The volume of water in each monitoring well shall then be purged a minimum of three times or until the well has been pumped dry. Conductivity, pH, and temperature shall be periodically measured and recorded during purging. Purging will be discontinued when stabilization of these parameters occurs. Each sample shall be collected from the groundwater monitoring wells with a Teflon or stainless steel bailer.

The private well located at 6707 Glenbrook Avenue shall be purged by connecting a hose to the existing indoor spigot and allowing the pump to run for a few minutes while checking the conductivity, pH and temperature. Field measurements shall be collected rapidly until stabilization occurs to ensure that enough water remains to fulfill sample volume requirements. The sample shall be collected directly from the spigot into the sample bottles.

4.4.C.2 Volatile Organic Compounds

Samples for determination of volatile organic compounds (VOCs) shall be removed first from each well after purging. Care shall be taken to minimize agitation/aeration of the samples at all stages of removal and containerization. Two replicate, samples (i.e., two 40 ml vials) shall be taken at each well with a Teflon bailer. Samples for VOCs shall be taken as soon as sufficient water volume is available in the well after appropriate purging, and then preserved as required in Table 3.1-2. All samples collected shall be placed in a cooler containing ice as soon as possible after samples are obtained as provided in the SOP (Appendix B).

4.4.C.3 Inorganics Analyses

Samples for determination of metals and cyanide shall be collected and preserved as provided in Section 4.5.6 in Appendix A of the SOP (Appendix B).

4.4.C.4 Extractable Organics Analyses

Samples for determination of organics shall be collected and preserved as provided in Section 4.5.6 and Appendix A of the ESD SOPs (Appendix B).

4.4.C.5 Field Measurements

A separate sample shall be collected for the field measurement of pH, specific conductance and temperature after the VOC samples are collected at each sample location. The sample removed from the well after VOC sampling shall be placed into a clean container. Temperature, pH, and specific conductance shall then be measured (temperature first). All measurements shall be made onsite immediately after the sample is removed from the well.

All probes shall be rinsed with distilled water and wiped clean with laboratory tissue after use at each well and decontaminated before removal from the site. The pH meter shall be calibrated prior to each day of sampling with two buffer solutions bracketing the expected sample pH (Appendix B). Calibration and maintenance events will be recorded in a field logbook.

4.5 RIVER BANK PROTECTION CONTROLS

4.5.A Inspection

The river bank slope protection in the central tract adjacent to the Ohio River shall be inspected quarterly. To the extent practicable, these inspections shall coincide with the quarterly sampling events and be conducted during periods of peak and minimum river flow.

The purpose of these inspection activities is to identify the potential evidence of distress which may lead to slope failures. These observations shall be recorded on the Report of Field Observation included in Appendix J.

4.5.A.1 Rip-rap Slopes

The rip-rap slopes shall be inspected quarterly for signs of deterioration including the following:

- o Subsidence
- o Erosion
- o Damp areas
- o Wet ground vegetation
- o Soft spots in surface
- o Seepage, Water flow

- o Sloughing, caving or surface erosion
- o Undermining of rip-rap edge by river flow
- o Vegetative growth on rip-rap slope
- o Buildup of trash and debris on rip-rap
- o Springs
- o Piping
- o Sand boils

If any of these signs occurs, EPA and the KDNREPC shall be notified immediately.

Possible appearances, locations and shapes of cracks and bulges along a typical slope are indicated on Figure 4.5-1. Reporting requirements, tolerance limits, and measurement requirements for above items are outlined in Table 4.A-1.

4.5.A.2 Natural Slopes

Examination of natural slopes shall be performed quarterly for signs of deterioration. The inspection should include but not be limited to monitoring of vegetation on the slopes. Developing cracks are often obscured by grass, tall leaves, and root mats. These cracks should be carefully uncovered by hand so their total extent can be estimated. Hidden cracks may be identified by tearing of shrubs and distortion of trees and tree root systems.

4.5.B Surveying

Surveying of the rip-rap slope and natural slope shall be conducted to monitor the extent and rate of any slope movement. Additional instrumentation may be required in the future and may include inclinometers, piezometers, extensometers, or strain gauges. Drainage pipes may also be required in order to relieve ponding on the surface.

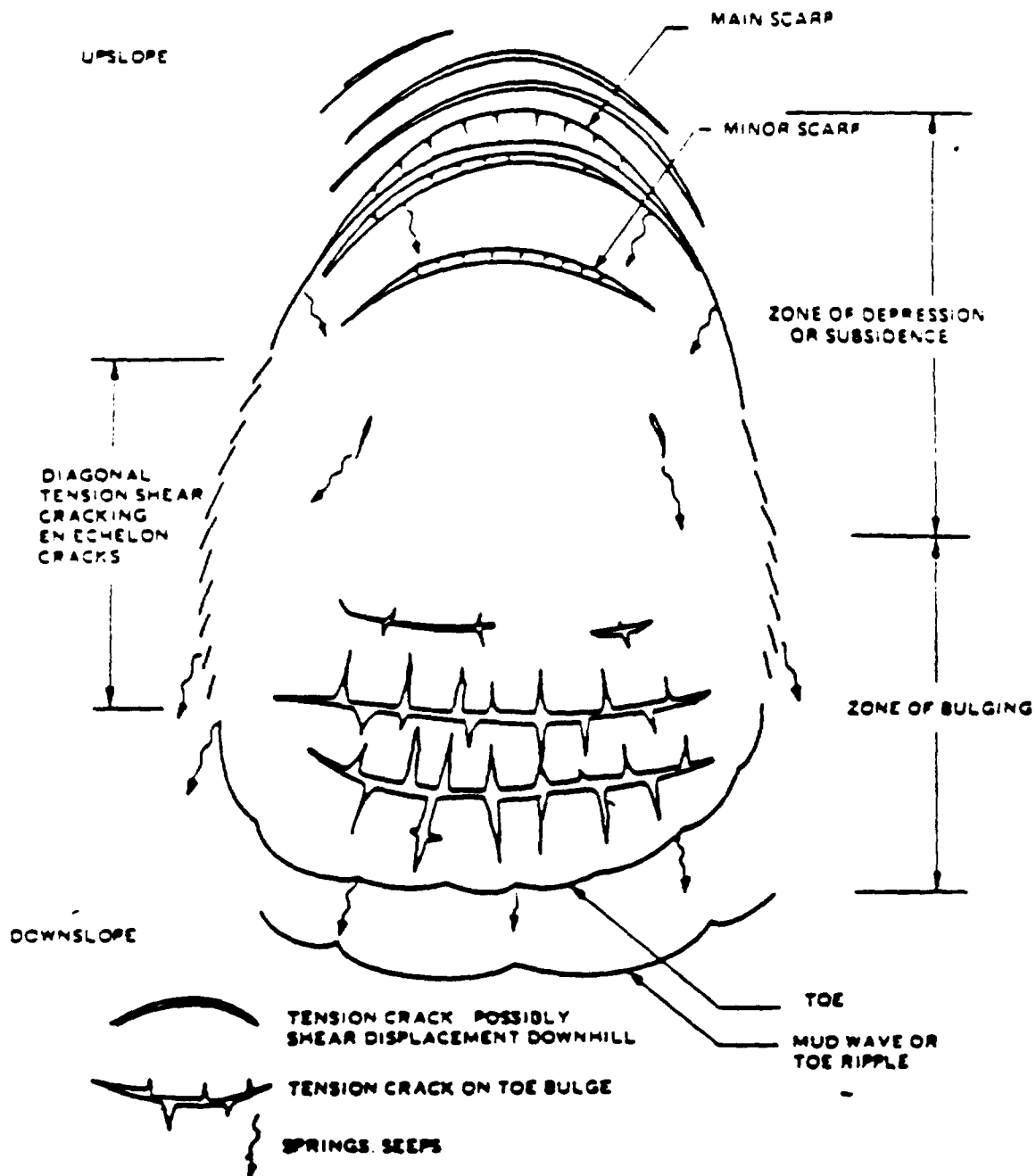


Table 4.A-1

**MONITORING AND REPORT SCHEDULE
FOR RIVER SLOPE**

Type of Report	Monitoring Frequency	Items to Be Observed/Monitored and Reported	Tolerance Limits	Inspector's Action
Visual Observation	Quarterly; with inspection to occur to the extent practicable during periods of peak and minimum flow in the Ohio River. If severe flooding occurs, additional inspection as deemed prudent by MSD in its professional judgment.	Subsidence	3"	Measure and report on descriptive report. Photograph location if possible.
		Erosion	-	Map location and nature.
		Damp Areas	-	Map location and nature
		Wet Ground Vegetation	-	Map location and nature
		Soft Spots in Surface	-	Map location, nature, and approximate size.
		Seepage, Water Flow	-	Map location and approximate amount of water seeping.

Type of Report	Monitoring Frequency	Items to Be Observed/Monitored and Reported	Tolerance Limits	Inspector's Action
		Sloughing, Caving, or Surface Erosion	3"	Notify designated authority, document on descriptive report. Photograph if possible.
		Cracking	1"	All cracks observed to be documented. Describe location and measure approximate width of crack. Photograph if possible
		Bulging (to the extent practicable)	1"	Describe location and approximate size. Photograph if possible.
		Seeps, soils, Sand Cones, Sand/Silt Trails, Minifans	-	Describe location, type.
		Vegetation	-	Report any change in leaf patterns on existing vegetation, tearing of shrubs, or any observed distortion of trees or roots with respect to previous observation.

Type of Report	Monitoring Frequency	Items to Be Observed/Monitored and Reported	Tolerance Limits	Inspector's Action
		Undermining of riprap edge by river flow	-	Notify designated authority, document on descriptive report and photograph if possible.
Surveying	Annually	Movements in Horizontal and Vertical Directions	$\pm 1"$ Horiz. Movement $\pm 3"$ Vert. Movement	Prepare comprehensive survey report with field observation and calculation. All readings shall be taken by a surveyor licensed in the State of Kentucky.

- Indicates no tolerance allowed.

Optical instrument survey and tape measurements shall be used to determine lateral and vertical movements of the river slope. Benchmark monument and transit stations are located on stable ground near the access road (see Appendix K). Using these monuments as baseline, subsequent movements can be determined by surveying. Transit lines shall be established by the surveyor, so that the vertical and horizontal displacements at the center and toe of the slope can be observed. The traverses or grid system across the slope area shall consist of lines perpendicular to the plane of the slope. The line spacing shall be 200 feet apart with reference points at intervals of 50 feet on each line. This spacing shall be maintained and referenced to the control benchmarks. Lateral motions shall be detected by transit and tape measurement from each hub. In the event a tension crack has opened up above the top of the slope, periodic measurement across the crack shall be made between two hubs established on each side of the crack to identify any further widening.

Because the survey monuments have been set in fill material above the existing landfill, the potential exists that settlement of the monuments will occur over time. If survey measurements indicate settlements which exceed tolerance limits, an immediate site inspection should be made to determine whether slope movement is occurring or whether the movement is due to settlement of the monuments. This surveillance should include visual inspection of the embankment.

4.5.C Rip-rap Slope Maintenance

The rip-rap slopes shall be sprayed annually for vegetation control to preclude the possibility of vegetative growth preventing a thorough inspection of the slope. The spray shall consist of "Hyvar Excel" or "Round Up" applied at a rate of 4 gals/acre or 2 qts/acre, respectively; or equal. The spray shall be applied so as to maintain a narrow vegetative buffer, which may consist of woody plants, along the river's edge. The width of the vegetative buffer shall be determined by MSD based upon its reasonable judgment.

If the visual inspections or surveys discover distress signs, a preventive maintenance program shall be developed and submitted to EPA for approval. The maintenance program shall be implemented upon approval by EPA. This maintenance program may include compaction of the affected area and replacing portions of the rip-rap.

4.6 LANDFILL, SURFACE AND CAP MONITORING AND MAINTENANCE

This section covers the O&M responsibilities for the clay cap placed during surface waste cleanup activities.

The clay covers placed over the "hot spot" areas and other site areas where surface trash was buried/covered designated in Appendix K shall be inspected quarterly for evidence of erosion. The observations shall be reported on the Report of Field Observation included in Appendix J.

Inspections shall be made by walking the entire area of the cap and looking for signs of erosion including the following: swales greater than 1 foot wide and 2 inches deep; cracks greater than 1 inch wide and 6 inches deep; inadequate growth of the grass cover (no bare areas greater than 36 sq. ft.); and ponded water larger than 2 feet in diameter by 3 inches deep.

Upon detection of the foregoing, the cover shall be repaired by regrading, clay replacement and compaction, and reseeding. Re-establishment of vegetative cover by reseeding or otherwise, if required, may be deferred to the appropriate seasonal time (spring and fall).

The grass covering the clay caps in the "hot spots" and the capped area in the central tract between the Ohio River and the access road shall be mowed at least monthly from May through September. From October through April, these areas shall be mowed on an as needed basis, as specified below.

Excessive grass height may reduce runoff away from the cover, may visually obstruct observation of the cover, or may damage the integrity of the cap.

Mowing in the "hot spot" areas should be frequent enough to prevent growth of woody plants and other vegetation which grows to a height of more than 2 to 3 feet. The grass cover on the capped area between the river and the access road shall be mowed when grass height reaches 8 inches. Mowing shall be performed using a Bush Hog type grooming mower. The grass shall be mowed to a height not less than 4 inches. Advice may be obtained from the Kentucky Soil Conservation Service (SCS) [Louisville, KY, Phone No. (502) 425-4482].

Table 4.A-3 summarizes the Operation and Maintenance activities and lists the frequency with which they are to be conducted.

4.7 O&M REPORTING REQUIREMENTS

A Report shall be submitted to EPA and the KDNREPC at the completion of each quarterly sampling event. The Report shall summarize the results for each O&M activity; identify any problems; and discuss any proposed action. A checklist to be used in reporting is attached in Appendix L.

TABLE 4.A-3

Maintenance Task, Frequency, Observations, and Actions
Lees Lane Landfill Site
Louisville, Kentucky

<u>TASK</u>	<u>FREQUENCY</u>	<u>MAINTENANCE OBSERVATIONS</u>	<u>MAINTENANCE ACTION</u>
Property Inspection (see Section 4.1)			
-Gas Collection system	Quarterly	See Below	See Below
-Groundwater monitor wells	Quarterly	See Below	See Below
-Gas monitor wells	Quarterly	See Below	See Below
-Institutional controls	Quarterly	Vehicular Damage, Vandalism, deterioration	Repair as appropriate
-Area wide site conditions	Quarterly	Exposed drums or waste	Report to appropriate agencies
		Major settlement (greater than 6" over 20 ft. span)	
		Evidence of leachate seepage, distressed vegetation	Report to appropriate agencies, photograph

<u>TASK</u>	<u>FREQUENCY</u>	<u>MAINTENANCE OBSERVATIONS</u>	<u>MAINTENANCE ACTION</u>
		Potholes, erosion of access road	Regrade/Repair
Air Quality Monitoring (see Section 4.2)			
-Ambient Air Screening	Quarterly	Organic vapors (≥ 0.5 ppm above background)	Initiate modified level D PPE.
		(>5 ppm above background)	Stop operation, evacuate site
		Combustible gases (>10% LEL)	Initiate continu- ous monitoring
		(>25% LEL)	Stop operation, evacuate site
			(Readings must return to safe level before activities resume)
-Ambient air sampling	Quarterly	High Concen- trations of gases	Evaluate data, report to appropriate agencies
-Meteorological Monitoring	Quarterly	Shift in pre- vailing wind	Adjust ambient air sampling location

<u>TASK</u>	<u>FREQUENCY</u>	<u>MAINTENANCE OBSERVATIONS</u>	<u>MAINTENANCE ACTION</u>
-Real time monitoring	Quarterly	High concentrations of gases	Evaluate data, report to appropriate agencies.
-Gas monitor well	Quarterly	Wells unlocked	Replace lock, secure well
		Guard posts/rails damaged or missing	Repair/replace posts or rails
		Protective casing damaged, missing or rusted	Repair/replace/sand and paint protective casing
		Concrete pads damaged or cracked	Repair damage
		Possible surface water infiltration	Slope pad away from well
		Vegetation/debris covering well	Cut vegetation, clear debris
		Well cap damaged or missing	Repair/replace cap

<u>TASK</u>	<u>FREQUENCY</u>	<u>MAINTENANCE OBSERVATIONS</u>	<u>MAINTENANCE ACTION</u>
Gas Collection System Balancing and Maintenance (see Section 4.3) -System maintenance	Quarterly	Tubing, fittings and valves damaged or missing	Repair/replace as necessary
		Vandalism to blower house wells or moisture traps	Repair damage
		Structural damage to blower house	Repair damage
		Blower not operating or visible damage	Monitor gas wells, repair system/damage
		Service box lids damaged or missing	Repair/replace lids
		Alarm and blower controls not functioning	Repair controls
		Excessive settlement or tilting of concrete well collars	Return collars to grade/vertical as needed

<u>TASK</u>	<u>FREQUENCY</u>	<u>MAINTENANCE OBSERVATIONS</u>	<u>MAINTENANCE ACTION</u>
		Well/moisture trap covers damaged or missing	Repair/replace covers
		Vegetation covering wells/mois- ture traps	Cut vegetation, clear well/moisture trap
		Adjustment valve in- accessible	Clear mud/debris obscuring valve
		Caps, plugs, or piping damaged or missing	Repair/replace cap, plug, or piping
		Identifica- tion signs damaged or missing	Repair/replace sign
-System balancing	Semi-annual	High/low pressure	Adjust valve, iso- late well and check pressure, repair as necessary
		High/low velocity	Assess condition, check blower, re- pair as necessary
		Water in well	Remove water, moni- tor for recharge

<u>TASK</u>	<u>FREQUENCY</u>	<u>MAINTENANCE OBSERVATIONS</u>	<u>MAINTENANCE ACTION</u>
Groundwater Quality Monitoring (see Section 4.4)	Quarterly	Decrease in total depth	Assess condition, repair if possible
		Damaged piping/plumbing	Repair as necessary
		Wells un- locked	Replace lock, secure well
		Guard posts/ rails damaged or missing	Repair/replace posts or rails
		Protective casing dam- aged, missing or rusted	Repair/replace/sand and paint protec- tive casing
		Concrete pads damaged or cracked	Repair damage
		Possible surface water infiltration	Slope pad away well
		Vegetation/ debris cover- ing well	Cut vegetation, clear debris
		Well cap damaged or missing	Repair/replace cap

<u>TASK</u>	<u>FREQUENCY</u>	<u>MAINTENANCE OBSERVATIONS</u>	<u>MAINTENANCE ACTION</u>
		High concentrations of contaminants	Evaluate data, report to appropriate agencies
Bank Protection Controls (see Section 4.5)			
-Rip-rap slope and drainage swales	quarterly (during peak and minimum river flow)	Subsidence of slope, sloughing or or caving (tolerance limit 3")	Measure, photograph assess, and repair if necessary
		Erosion of rip-rap or underlying material	Measure, photograph assess and repair if necessary
		Damp areas	Photograph, assess and repair if necessary
		Seepage, water flow, piping or sand boils	Photograph, assess and repair if necessary
	Quarterly	Vegetative growth on slope	Remove vegetation by hand or spraying with herbicide

<u>TASK</u>	<u>FREQUENCY</u>	<u>MAINTENANCE OBSERVATIONS</u>	<u>MAINTENANCE ACTION</u>
		Trash and debris on on slope	Remove trash and debris as necessary
		Exposed trash or filter fabric	Photograph, assess and repair as necessary
		Tension cracks or bulging (to the extent practicable) [tolerance limit 1"]	Measure, photograph assess and repair as necessary
		Survey monuments damaged or missing	Repair/replace monument
-Natural slopes	Quarterly (during periods of peak and minimum river flow)	Same as rip-rap slope observations plus:	
		Vegetative growth on slope	Do not remove vegetation, uncover and observe cracks
		Soft spots in surface	Assess and repair as necessary

<u>TASK</u>	<u>FREQUENCY</u>	<u>MAINTENANCE OBSERVATIONS</u>	<u>MAINTENANCE ACTION</u>
		Tilting trees	Photograph, assess and repair as necessary
-Surveying	Annually	Movement of slopes (Tolerance limit: $\pm 1''$ Horizontal, $\pm 3''$ Vertical)	Assess and adjust survey frequency as directed by EPA or KDNREPC; repair as necessary
Clay Covers			
-Visual observations	Quarterly	Swales (greater than 1 foot wide and 2 inches deep)	Measure, photograph assess and repair as necessary
		Cracks (greater than 1 inch wide and 6 inches deep)	Measure, photograph assess and repair as necessary
		Inadequate grass cover (area greater than 36ft ²)	Measure, photograph assess and repair as necessary

<u>TASK</u>	<u>FREQUENCY</u>	<u>MAINTENANCE OBSERVATIONS</u>	<u>MAINTENANCE ACTION</u>
		Ponded water (area larger than 2 ft. dia. X 3 in. deep)	Measure, photograph assess and repair as necessary
		Erosion or ponded water (greater than 12 in. deep requires immediate repair)	Measure, photograph and repair imme- diately
-Mowing	Period- ically	Grass height reaches 8"	Mow